

Serial No.: 10/696,757
Inventor(s): John A. Sollars

U.S. PTO Customer No. 25280
Case No.: 2056B

REMARKS

Claim Summary. Claims 10, 13-16, 18, 22-23, 37-41 are pending. Claims 1-9, 11-12, 17, 19-21, and 24-36 have been canceled without prejudice.

Rejection. Claims 10, 13-16, 18, 22-23 and 37-41 are rejected under section 103(a) as anticipated by Japanese Utility Model 50-145875 to Katsutoshi et al. (hereinafter "Japanese 875"). Applicant disagrees, and traverses this rejection.

Test Data. In the Office Action, the Examiner requests, and suggests, quantitative results to show "unexpected superiority". See Office Action, page 4, first paragraph. In response, Applicant has conducted testing to prove exactly that -- unpredictable and unexpected results -- by comparative testing of the invention to the prior art cited in the Office Action against the application.

No Obviousness Under Section 103(a)

It would not have been obvious for one of ordinary skill in the art, at the time the invention was made, to modify the teachings of the Japanese 875 utility model to make the invention as claimed. Applicant in this instance has discovered that by significantly reducing the number of yarns in the region between interconnected joints, it is possible to substantially improve air retention in airbag structures using such a modified seam with modified yarn arrangement. This discovery was unpredictable and unexpected. Test data proving this unexpected result has been submitted. There is no teaching in the cited art of reducing the yarns in region between interconnected joints in the cited prior art. There is no such teaching in the Japanese 875 utility model. In fact, there are contrary teachings in the prior art. At least one prior art reference actually teaches away from a reduction in the number of yarns in between the interconnected joints.

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*Test Data Proving Unexpected Results
Compared to Cited Prior Art*

Applicant submits in the Declaration of John A. Sollars, Jr. ("Sollars Declaration") actual test data proving the superiority of reducing the number of yarns between interconnected joints. This data directly compares the invention to the prior art reference cited in the Office Action. The test data shows the unpredictable and unexpected results of the invention.

The Invention. The invention, in one embodiment, includes an airbag cushion structure of interconnected woven in joints that resist gas permeation, the structure having between the first and second interconnected joints with 2-4 yarns in the first layer and 2-4 yarns in the second layer. Thus, in the invention, woven in joints are provided with a total of between 4 and 8 yarns per two-layer structure between joints, i.e. counting both the top and bottom layers between interconnected joints. One such embodiment of the invention is illustrated in the patent application in Figures 5-6. The use of closely spaced joints is useful in forming flow barrier elements in the airbag cushion, as described on page 15 of the patent application specification. Such a structure resists gas leakage, and retains gas pressure for longer periods of time. Sollars Declaration, para. 4.

Japanese 875. John Sollars, the inventor, reviewed Japanese Utility Model 50 [1975] - 145875 to Katsutoshi Ando et al. (hereafter "the Japanese 875 patent"). Figure 2 of the Japanese 875 is an airbag with a weave that includes twelve total (12) yarns, the structure having six (6) yarns in each layer of a two layer structure, between interconnected joints, for a total of 12 yarns. Sollars Declaration, para. 5.

Testing. The inventor, John Sollars, conducted testing of the seams of the invention, as compared to seams as shown and disclosed in the Japanese 875 patent. Sollars Declaration, para. 6. He made special airbags using the so-called "cross-over" seam of the invention, having interconnected joints as

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described and claimed in the patent application. Airbags were made with 4 total yarns (2 per side) between interconnected joints as a representative example of the invention. Furthermore, other comparative airbags were made in the same manner, but with 12 total yarns (6 per side) between interconnected joints to represent the Japanese 875 patent embodiments. Sollars Declaration, para. 6. The pressure readings on the Y-axis of the graphs of Figure 1-2, attached to the Sollars Declaration, represent the pressure experienced in the airbag over time, after pressure is applied to the airbag seam. See results in Figure 1, Sollars Declaration. The full size airbag was tested at a higher, more rigorous pressure, as shown in Figure 2. Sollars Declaration, para. 6.

Unexpected and Unpredictable Results. In all instances, the airbags having seams with 12 yarns between interconnected joints (as suggested in Figure 2 of Japanese 875) undesirably leaked down to a lower pressure faster as compared to the leak down rate of the seams of airbags that employed the invention. Sollars Declaration, para. 7. It is more desirable, and the bag of greater value in the market, for the bag to retain air pressure as long as possible. Sollars Declaration, para. 7. A seam type that will retain pressure longer will allow the use of less coating material to achieve the required and specified leak down requirement. This savings of material translates in to product cost savings and economic advantage. These tests results are unexpected. See Sollars Declaration, para. 7.

Substantial Improvement. The invention, in one laboratory test, showed a 22% improvement in performance compared to the Japanese 875 sample. Sollars Declaration, para. 8. This advantage of the invention shows even a higher relative difference at the typical 5-6 second time interval required in the industry, i.e. the seams of the invention compared to the seams shown in the Japanese 875 teachings. Sollars Declaration, para. 8. For example, the data showed when tested at 10.15 psi airbag pressure, at 5 seconds of elapsed time, for a full size bag, a 12 yarn wide seam showed 6.24 psi. At 5 seconds of time

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for the 4 yarn seam (invention), the pressure value of 7.61 was recorded. This is an increase in performance for the 4 yarn seam/airbag of the invention of about 22% improvement compared to the Japanese 875 sample.

Thirty Four Percent Improvement at Elevated Test Pressure. In another example tested on actual full size airbag cushions, the invention showed a 34% improvement when compared to the prior art Japanese 875 sample. Sollars Declaration, para. 8. The higher and more rigorous starting pressure, as shown in Figure 2, of 14.5 psi, causes even greater shifting of the yarns in the undesirable Japanese 875 sample, with undesirable gas leakage through the seam of the Japanese sample. Sollars Declaration, para. 9. Further, at the 14.5 psi starting pressure, at 5 seconds, the percent improvement was about 34% when comparing the 4 yarn seam of the invention to the 12 yarn seam of the Japanese 875 embodiment. Again, these are significant and unexpected results in the difference in the ability of these two samples to retain applied gas pressure when used in an airbag. Sollars Declaration, para. 9. The results are due to the discovery which embodies the new seaming arrangement.

No Obviousness Under Section 103(a)

No Motivation. There is no motivation expressed in the Japanese 875 patent for changing the number of yarns as displayed in Figure 2 or Figure 4 of Japanese 875 to reduce the number of yarns in both of these layers. There is simply no cited teaching in the art for changing the structure of Japanese 875 to conform to the claimed invention, and the only source applicant has found for a motivation to make such a change is the hindsight reconstruction by the Office Action --- that is --- *intentionally modifying the prior art to conform it to meet the stated and disclosed structure of the claimed invention, using the claimed invention as a guide in making such modification.* This type of hindsight reconstruction which uses as a guide the applicant's claimed invention is insufficient to establish obviousness under Section 103.

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No Prima Facie Case. There is no *prima facie* case of obviousness, since the claimed reference does not teach all the elements of the claimed invention. In the invention, it has been found that an inflatable airbag cushion may be constructed that employs multiple fabric layers having relatively closely spaced interconnected woven joints. This structure has been found by the inventors to desirably resist gas permeation across the joints. That is, in the practice of the invention, there is a first interconnected joint and a second interconnected joint. The first and second interconnected joints run generally parallel to each other. The first and second interconnected joints each form a woven union of said first and second woven fabric layers along the length of the interconnected joints. The number of yarns positioned between said first and second interconnected joints in the practice of the invention is no more than about four yarns in each of the first and second layers. (See claims). It has been found that using no more than about four yarns in both the first and second layers resists gas permeation across the joint, which is highly desirable in airbag performance. Thus, this structural feature is especially advantageous in the gas retention characteristics of the airbag cushion, and there is no recognition of this structure or its performance advantage in the cited reference.

Japanese 875 is Insufficient. The Japanese 875 patent does not teach using no more than four yarns in a first layer. Further, the Japanese 875 patent does not teach using no more than four yarns in the second layer. Thus, this prior art reference does not provide a *prima facie* case of obviousness, since the feature of having a reduced number of yarns in this region is missing from the Japanese 875 reference.

The Specification is Clear. The specification indicates clearly the advantages of the airbag structure of the invention. On page 4, lines 21-22 of the disclosure, the inventive cushion structure is stated to "retain gas pressure for a prolonged period of time after inflation". Likewise, Figure 5 and 6 are disclosed as particularly preferred embodiments of the invention (see page 7, lines 15-21), and Figures 5 and 6 show no more than four yarns in both the first

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and second woven fabric layers. Further, on page 15, lines 15-17, the specification indicates: "In the most preferred practice only about two to four yarns in each layer of fabric will be disposed in the region between the closely spaced joints (FIGS. 5 and 6)". Further, it is stated: "The use of very closely spaced joints is believed to be particularly useful in forming the flow barrier elements 14 which define the perimeter of the cushion." Page 15, lines 22-23.

To achieve closely spaced joints, one preferably may use no more than four yarns in the first and second woven fabric layers. Thus, it is evident in the applicant's specification that the use of closely spaced joints, with a minimized number of yarns between the joints, assists in the retention of gas pressure and structure of flow barrier elements in the practice of the invention.

No Suggestion in Japanese 875. There is no suggestion in Japanese 875 to alter the structure of the airbag shown in that reference to change the number of yarns employed in that structure. The only suggestion found is invented in the language of the Office Action, and in response to review of applicant's invention and specification. This sort of hindsight reconstruction of prior art to try and conform or change the structure of the prior art to approximate that of the disclosed invention is *not* an appropriate manner of approaching obviousness under Section 103.

Prior Art Teaches Away From Invention. In fact, some prior art would teach in favor of *increasing* the number of yarns between joints. That is, the use of a crossover yarn which begins in one layer and "crosses over" to a second layer is shown, for example in U.S. Patent No. 3,991,249 to Yamashita et al. Figure 1D of this Yamashita patent (which was cited in applicant's Information Disclosure Statement of May 10, 2004) shows a "crossover" yarn 4a that is used for forming the face fabric of the tubular weave portion 1. This yarn 4a is also used in the Yamashita disclosure for forming the back fabric of small weave portion 2a. Figure 1A illustrates a woven airbag material with a plurality of stitched portions 2 formed at a position between two adjacent tubular weave

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portions 1. The length of each small tubular weave portion 2a and 2b is a full 2 centimeters. See column 6, lines 5-8. This prior art patent suggests using a great number of yarns (i.e. several centimeters in woven width) between the points at which crossover occurs in an airbag fabric. Thus, this teaching of Yamashita counsels in favor of using substantially more yarns than is shown in Japanese 875 in such the intermediate zone between tubular weave portions. This Yamashita reference counsels in favor of using much more than a maximum of four yarns in the region between joints.

Yamashita Teaches Away From Invention. Prior art (Yamashita, et. al) teaches in favor of *increasing* the number of yarns between joints in such woven airbag structures. There is no motivation expressed in the art, or cited in the Office Action, to modify Japanese 875 by *decreasing* the number of yarns between joints. Thus, there is no obviousness of the claimed invention, because a finding of obviousness requires a cited and express teaching set forth in the art that would counsel in favor of making the modification to *decrease* the number of yarns between joints.

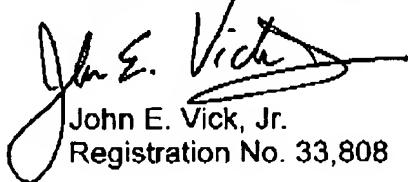
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Conclusion

All pending claims now stand in condition for allowance. In the event that there are additional fees associated with the submission of these papers (including extension of time fees beyond that requested in the accompanying papers), authorization is hereby provided to withdraw such fees from Deposit Account No. 04-0500.

Respectfully submitted,



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